

**GUJARAT TECHNOLOGICAL UNIVERSITY****ME - SEMESTER-II • EXAMINATION – SUMMER • 2014****Subject Code: 1723102****Date: 18-06-2014****Subject Name: Advanced Biomedical Imaging****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Give difference between Digital X-ray vs. Film X-Ray. **07**  
Also mention advantages of Digital X-Ray.
- (b) Enlist and explain various applications of scintigraphy. **07**
- Q.2** (a) Enlist and explain the causes of Artifacts in PET scanning. **07**
- (b) Explain the application of SPECT for Detection of Neurological Diseases. **07**
- OR**
- (b) Enlist the applications of thermal imaging technique in medical imaging. **07**  
Describe any three in detail with block diagrams.
- Q.3** (a) Briefly describe Digital radiographic system. **07**
- (b) Describe the third, fourth and fifth CT generations. **07**
- OR**
- Q.3** (a) Explain instrumentation of CT scan system with schematic block diagram. **07**
- (b) Explain slice select gradient for MRI. How to change the slice thickness? **07**
- Q.4** (a) Describe various applications of photoacoustic imaging. **07**
- (b) Explain spatial resolution and contrast resolution with appropriate examples. **07**
- OR**
- Q.4** (a) Explain back projection and filtered back projection algorithms with necessary diagrams. **07**
- Q.4** (b) What are the major challenges in PAT scan? Explain the reconstruction techniques. **07**
- Q.5** (a) Enlist and explain the properties of magnetic particle. **07**
- (b) Write a brief note on Gamma Camera. **07**
- OR**
- Q.5** (a) What are the limitations of magnetic particle imaging? **07**
- (b) Compare the number of visible light photons emitted by a calcium tungstate screen with the number emitted by a gadolinium oxysulfide screen. Assume that 100 x-ray photons, each having an energy of 30 keV, strike the screen. The following data are given: **07**

	<i>Calcium Tungstate</i>	<i>Gadolinium Oxysulfide</i>
Absorption (%)	40	60
Conversion (%)	5	20
Spectral emission peak (nm)	420	550

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